

## **Brush Management**

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### **Introduction**

Slowing the pace of brush encroachment into pastures is a challenge to land managers. Understanding the biology and ecology of woody species targeted for control is important to developing effective management strategies. A critical need is to determine what set of conditions or series of events responsible for the invasion of pastures by woody species. Often the woody plant movement into pastures and subsequent expansion has been favored by overgrazing. Some characteristics are shared by woody species that can become weeds in pastures. These characteristics include: high seed production; seeds that persist in the soil for many years; ability to disperse over long distances; ability to resprout following top removal; tolerance to low levels of water or nutrients; and low palatability (Archer and Smeins, 1991).

High concentrations of livestock facilitate woody plant invasion into grasslands in several ways (Archer and Smeins, 1991). Seed dispersal by livestock and wildlife contributes to the brush invasion process. Animals provide a means of dispersing woody species by eating the seeds and depositing them after they pass through their digestive tract. Compaction of surface soils by livestock can favor recruitment of woody species over grasses. Overgrazing reduces vigor of forage species and decreases their ability to suppress encroaching woody species and reduces the amount of herbage or "fine fuel" available to carry a fire. Historically, fire has been a principle force responsible for reducing woody species movement into grasslands.

Before a brush management strategy can be developed it is important to assess the means of regeneration or reproduction. Woody species can be classified as those that reproduce only by seed and those that reproduce by seed and vegetative propagation from buds located on the root or crown of the parent plant. Eastern redcedar is an example of a woody species that reproduces solely by seed. Once the main stem of eastern redcedar is removed the plant is dead. In contrast, when the main stem of honey locust is removed, buds located on the crown produce stems that enable the plant to persist.

Most woody species can be categorized as one of four growth types: (1) upright, single-stemmed trees; (2) bushes or trees with a creeping growth habit; (3) multi-stemmed bushes; and (4) those plants that grow as vines or canes (Scifres, 1980). Original-growth oaks, ashes, elms, honey locust, and osage orange are examples of single-stemmed upright growth forms. Wild plum,

buckbrush, and dogwoods that possess multiple shoots arising from a spreading root system are examples of creeping growth habit. Multi-stemmed brush often results from a single-stemmed tree that was incompletely controlled in some manner. Finally, blackberry and multiflora rose are examples of plants that exhibit the vine type growth. Upon removal of the top of these plants new shoots may arise from the base of the plant located below-ground or new shoots can arise from cut stems, other wise know as canes, that are pressed into the ground and take root.

### **Brush Control Measures**

As with herbaceous weeds, biological, mechanical, cultural, and chemical control measures are available to manage brush in pastures. The most promising measures to manage brush are herbicides. Specific recommendations for woody species can be found in Table 1.

#### **Broadcast Application**

Herbicides can be broadcast applied aerially or by ground equipment. Where the targeted brush stands are tall and/or dense aerial application may be most suitable. Aerial applications may be applied by fixed-wing aircraft or helicopter. Use of application technology that reduces drift potential is important. Spray volumes should be no less than 5 gallons per acre. The spray boom should be no more than  $\frac{3}{4}$  of the wing span in total length. Spray only when wind velocity is low, but avoid spraying under calm conditions. With ground spray equipment, keeping the spray boom as a low as possible without disrupting the desired spray pattern could reduce spray drift. Total spray delivery volume of 20 gallons per acre will also reduce drift potential and increase coverage of the targeted brush species.

#### **Individual Plant Treatment Techniques**

Individual plant treatment can be an efficient, cost-effective alternative to broadcast applications to control brush, shrubs, or vines. Individual plant treatments include spot applied concentrate, high volume foliar, low volume basal, and cut-sump applications.

**Spot-applied concentrate.** Soil-applied spot applications of Tordon 22K can be used to control brush species including eastern redcedar and other junipers. Apply undiluted herbicide with a spot gun, which automatically pre-measures the amount of herbicide. Apply to the soil inside the dripline in a ring around the plant. Rate of application is 3 to 4 ml of Tordon 22K per 3 feet of plant height and trees greater than 15 feet tall should not be treated. Application should precede periods of expected rainfall.

**High volume foliar.** The high-volume foliar technique is ideal for small trees, vines, bushes with canes or stems, such as multiflora rose, or low-growing shrubs like buckbrush. You can use Remedy and Grazon P+D herbicides for excellent broad-spectrum brush and weed control. This is an ideal combination to clean up and maintain high-value fencerows and stop encroaching weeds and brush around pasture perimeters. Apply diluted herbicide directly to a target plant's foliage. Cover the entire plant. For large jobs, use a tractor-powered sprayer or other power equipment. For small jobs, use a pump-up or backpack sprayer. Coverage is critical to this method's effectiveness. The target plant should have healthy foliage. Insects, hail, freezing temperatures, drought or other conditions that damage foliage may reduce control. For best results, spray after full leaf expansion when the plants are actively growing. Plants should be sprayed from both sides until dripping wet. To improve coverage, use 1 quart of an approved agricultural surfactant per 100 gallons of spray mix. If brush is too tall, use a basal treatment. The table below provides mixing ratios for smaller batches.

### High-Volume Foliar Tank-Mix Guide

Sprayer Size	Remedy	Grazon P+D	Surfactant
1 gallon	2 tsp	8 tsp	4 tsp
3 gallons	1 fl oz	4 fl oz	2 fl oz
5 gallons	1.6 fl oz	6.4 fl oz	3.2 fl oz
10 gallons	3.2 fl oz	12.8 fl oz	6.4 fl oz
14 gallons	4.5 fl oz	18 fl oz	9 fl oz
25 gallons	8 fl oz	2 pts	1 pt
100 gallons	1 qt	4 qts	2 qts

**Low volume basal.** This method uses a high percentage of herbicide, so less spray volume is needed than other forms of basal application. Generally, the mix ratios are 20-30% herbicide plus 70-80% diesel fuel. For a more convenient, no-mixing option, go with ready-to-use Remedy\* RTU herbicide. Use low-volume basal applications to control woody species with trunks less than 6 inches in diameter at the base of the tree. Apply enough of the spray to wet the lower 15 to 20 inches of the trunk including the root collar area, but not to the point of runoff. Use this method any time of the year, except when snow or water prevents spraying to the groundline. The table below provides mixing ratios for the combination of Remedy plus diesel fuel for various sprayer sizes.

### Low-Volume Basal/Cut-Stump Tank-Mix Guide

Sprayer Size	25% Solution (25% Remedy + 75% Diesel Fuel/Fuel Oil)
1 gallon	1 qt Remedy + 3 qts diesel fuel/fuel oil
3 gallons	3 qts Remedy + 9 qts (2 gallons, 1 qt) diesel fuel/fuel oil
20 gallons	5 gallons Remedy + 15 gallons diesel fuel/fuel oil
50 gallons	12.5 gallons Remedy + 37.5 gallons diesel fuel/fuel oil

**Cut-stump:** Cooler weather and a lighter workload make the fall or winter a good time to control brush. Mechanically controlled brush quickly resprouts thicker and heartier than before. But you can kill the stump for good with Remedy herbicide. Apply a solution of 25 % Remedy plus 75 % diesel fuel, or Remedy RTU straight out of the jug, to the freshly cut stump. Spray the sides of the stump and the outer portion of the cut surface, including the cambium ring along the inner bark. Thoroughly wet the stem and root collar area, but not to the point of runoff. Treat stumps any time of the year, as long as snow or water doesn't prevent proper application.

Table 1. Rate (per acre) and time of foliar application of herbicides for optimum brush control. (pts = pints; qts = quarts)												
Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ash					1-2 pts Remedy + 1 lb 2,4-D							
Beech					1-2 pts Remedy + 1 lb 2,4-D							
Blackberry					1-2 pts Remedy + 1 lb 2,4-D							
Brambles					2 qts Grazon P+D							
Buckbrush				1 qt Grazon + 1 lb 2,4-D LVE (prior to waxy leaf)								
Cottonwood					2-4 qts Grazon P+D or 1-2 pts Remedy + 1 lb 2,4-D							
Dogwood					1-2 pts Remedy + 1 lb 2,4-D							
Elderberry					1-2 pts Remedy + 1 lb 2,4-D							
Elm					2 qts Grazon P+D + 1 pt Remedy							
Hackberry					2-4 qts Grazon P+D							
Hawthorne					1-2 pts Remedy + 1 lb 2,4-D							
Honeysuckle					1-2 pts Remedy + 1 lb 2,4-D							
Locusts					2-4 qts Grazon P+D							
Maple					1-2 pts Remedy + 1 lb 2,4-D							
Multiflora Rose					2 qts Grazon P+D + 1 pt Remedy							

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Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Oaks					2 pts Remedy + 1-2 lbs 2,4-D							
Osage Orange					1-2 pts Remedy + 1 lb 2,4-D or 3-4 qts Grazon P+D							
Persimmon					3-4 qts Grazon P+D							
Plums				2 qts Grazon P+D								
Poison Ivy					1-2 pts Remedy + 1 lb 2,4-D							
Poison Oak					1-2 pts Remedy + 1 lb 2,4-D							
Poplar					1-2 pts Remedy + 1 lb 2,4-D							
Red Cedar	Undiluted Tordon 22K soil applied at 2 ml/foot of tree height				Foliar - 2% Grazon P+D or 2% Remedy			Undiluted Torclon 22K soil applied at 2 ml/foot of tree height				
Russian Olive					1-2 pts Remedy + 1 lb 2,4-D							
Skunkbrush sumac					1-2 pts Remedy + 1 lb 2,4-D							
Smooth sumac					2-3 pts Grazon P+D							
Sycamore					1-2 pts Remedy + 1 lb 2,4-D							
Trumpet Creeper					1-2 pts Remedy + 1 lb 2,4-D							
Wild Rose					1-2 pts Remedy + 1 lb 2,4-D							
Willow					2-4 qts Grazon P+D or 1-2 pts Remedy + 1 lb 2,4-D							

Use the higher end of the rate range when treating brush 10' or taller. Always use a drift agent, a surfactant and a minimum of 5 gallons/acre when applying by air. Some applications may require retreatment the following year.

Treat individual plants using a low volume basal stem or cut stump treatments. Mix Remedy with diesel fuel or kerosene at a ratio of 25% Remedy to 75% fuel oil. Low volume basal stem treatments should be applied to a 18 to 20 inch segment of the basal stem starting at ground level. Apply herbicide:oil solution to freshly cut stump. Spray the sides of the stump and the outer portion of the cut surface, including the cambium ring along the inner bark. Thoroughly wet the stem and root collar area, but not to the point of runoff. Low volume basal and cut stump treatments can be made any time of the year, as long as snow or water doesn't prevent proper application.

### **Literature Cited**

Archer, S. and F.E. Smeins. 1991. Ecosystem-level process. p. 109-140. In: Heitschmidt, R.K. and J.W. Stuth (eds.), Grazing management: An ecological perspective.

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